

Applicant(s): Jae-Hak Kim, et al.  
U.S. Serial No.: 09/994,508

#### REMARKS

Claims 1-22 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite. Claim 1 has been amended to clarify the language referred to by the Examiner. Accordingly, it is believed that the rejections are overcome, and reconsideration of the rejections is requested.

Claims 1-22 are rejected under 35 U.S.C. §103(a) as being unpatentable over Forbes, et al. (U.S. Patent Number 5,926,740) and Loboda, et al. (U.S. Patent Number 5,818,071). In view of the amendments to the claims and the following remarks, the rejections are respectfully traversed, and reconsideration of the rejections is requested.

In accordance with the applicants' invention, a semiconductor device is fabricated with an interlayer insulation layer having a low-dielectric constant. A silicon oxycarbide layer is formed on a substrate. The silicon oxycarbide layer is the low-dielectric interlayer insulation layer of the invention. After the silicon oxycarbide layer is formed, it is treated with plasma. Next, photoresist can be stacked on the plasma-treated oxycarbide layer and patterned. Alternatively, an interconnection can be formed at the silicon oxycarbide layer using a damascene process. Features of the invention have been clarified in the amended claims. Specifically, the claims now clarify that the silicon oxycarbide layer is treated with plasma after it is formed on the substrate. It is believed that this clarifying language patentably distinguishes the cited prior art.

Forbes, et al. disclose an anti-reflective coating for photolithography, as opposed to the interlayer insulation layer claimed by the applicants. Referring to Figure 1 of Forbes, et al., the anti-reflective coating includes a first layer 105 and a second layer 110. The second layer 110 includes silicon oxycarbide. In several of the disclosed embodiments, the silicon oxycarbide second layer 110 is formed by plasma-assisted chemical vapor deposition (CVD). The Examiner refers to this use of plasma as the applicants' claimed treating of the oxycarbide layer with plasma. However, it is believed that the amendments to the claims serve to distinguish this feature of the Forbes, et al. process. Specifically, the claims now specify that, in the applicants' invention, the plasma treatment occurs after the silicon oxycarbide layer is formed. This distinguishes the plasma-assisted CVD disclosed in Forbes, et al. which is part of the actual

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oxycarbide layer formation process. Furthermore, as noted above, the applicants' claimed invention is an interlayer insulation layer. In contrast, Forbes, et al. is directed to an anti-reflective coating. Accordingly, it is believed that Forbes, et al. neither teach nor suggest the invention set forth in the amended claims.

Loboda, et al. is cited as teaching silicon oxycarbide as a low-dielectric constant material. However, Loboda, et al. fail to teach forming the silicon oxycarbide layer on a substrate as a low-dielectric interlayer insulation layer and then, after formation of the silicon oxycarbide layer, treating the silicon oxycarbide layer with plasma, as claimed by the applicants. Accordingly, Loboda, et al. also fail to teach or suggest the invention set forth in the amended claims.

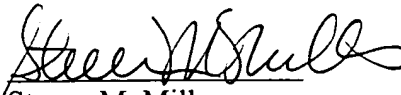
Since neither Forbes, et al. nor Loboda, et al. teach or suggest the invention set forth in the amended claims, combining the references also fails to provide such teaching or suggestion. Since neither Forbes, et al. nor Loboda, et al., taken alone or in combination, teach or suggest the invention set forth in the amended claims, it is believed that the amended claims are allowable over the cited references. Therefore, reconsideration of the rejections of the claims under 35 U.S.C. §103(a) based on Forbes, et al. and Loboda, et al. is respectfully requested.

Attached hereto is a marked-up version of the changes made to the application by the current Amendment. The attached pages are captioned "Version with Markings to Show Changes Made."

In view of the foregoing remarks, it is believed that all claims pending in the application (claims 1-9) are in condition for allowance, and such allowance is respectfully solicited. If a telephone conference will expedite prosecution of the application, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

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Version with Markings to Show Changes Made

In the Claims

The claims have been amended as follows:

1. (Amended) A method of fabricating a semiconductor device having a low dielectric interlayer insulation layer, the method comprising:
  - forming a silicon oxycarbide layer [at] as the low dielectric interlayer insulation layer on a substrate;
  - after the silicon oxycarbide layer is formed, treating the silicon oxycarbide layer with plasma; and
  - stacking [a] photoresist on the plasma-treated oxycarbide layer and patterning the resultant structure.
  
11. (Amended) A method of fabricating a semiconductor device having a low dielectric interlayer insulation layer, comprising:
  - stacking a silicon oxycarbide layer (SiOC) [at] as the low dielectric interlayer insulation layer on a substrate;
  - after the silicon oxycarbide layer is formed, treating the silicon oxycarbide layer with plasma; and
  - forming an interconnection at the silicon oxycarbide layer using a damascene process.